

What is claimed is:

1           1.     An apparatus for measuring the gripping strength of a vacuum gripping  
2 tool comprising:

3           a platform including a platform body and a platform surface for receiving a  
4 vacuum head of a vacuum gripping tool thereon;

5           a pressure gauge;

6           a conduit extending through said platform body, extending to said pressure  
7 gauge, and terminating at an opening formed in said platform surface; and

8           a positioning device that positions a vacuum port of said vacuum head over said  
9 opening.

1           2.     The apparatus as in claim 1, wherein said vacuum head includes a flat  
2 gripping surface and said positioning device urges said flat gripping surface to  
3 continuously confront a flat receiving surface of said platform surface.

1           3.     The apparatus as in claim 1, further comprising a power source for  
2 providing voltage to said pressure gauge.

1           4.     The apparatus as in claim 1, wherein said pressure gauge is pre-  
2 programmed with acceptable vacuum pressure values and unacceptable vacuum  
3 pressure values, measures vacuum pressure, and includes a display that indicates if  
4 measured vacuum pressure is acceptable or unacceptable.

1           5.     The apparatus as in claim 1, wherein said pressure gauge displays a  
2 numeric value indicative of measured vacuum pressure.

1           6.     The apparatus as in claim 1, further comprising a clamp that contacts said  
2 vacuum head and exerts a force that downwardly urges said vacuum head toward said  
3 platform surface.

1           7.     The apparatus as in claim 6, wherein said clamp includes a flexible beam  
2     affixed to said platform surface.

1           8.     The apparatus as in claim 1, wherein said positioning device includes a  
2     pair of complimentary positioning members, each positioning member including a spring  
3     and an abutment member, said pair of complimentary positioning members resiliently  
4     positioning said vacuum head over said opening.

1           9.     The apparatus as in claim 8, wherein each positioning member further  
2     includes guide pins.

1           10.    The apparatus as in claim 8, wherein said positioning members of said  
2     pair of complimentary positioning members urge said vacuum head in substantially  
3     opposite lateral directions.

1           11.    The apparatus as in claim 8, wherein said positioning members of said  
2     pair of complimentary positioning members include respective spring force directions  
3     that form an obtuse angle.

1           12.    The apparatus as in claim 8, wherein each abutment member includes a  
2     guide face substantially orthogonal to said platform surface and an overhang disposed  
3     over said guide face.

1           13.    The apparatus as in claim 12, wherein said vacuum head includes an  
2     opposed face opposite said gripping surface, and each overhang portion includes a  
3     surface that faces said opposed face.

1           14.    The apparatus as in claim 13, wherein each overhang portion contacts  
2     said opposed face and guides said vacuum head toward said platform surface.

1           15. The apparatus as in claim 8, wherein said positioning members of said  
2 pair of complimentary positioning members include respective opposite linear force  
3 components along a plane formed by said pedestal surface.

1           16. The apparatus as in claim 15, wherein said linear force component is  
2 along an x-axis direction and said positioning device further includes a mechanical stop  
3 that stops motion of said vacuum head along a y-axis direction of said plane.

1           17. The apparatus as in claim 1, wherein said positioning device further  
2 includes a mechanical stop affixed to said platform surface and having a stop surface  
3 substantially orthogonal to said platform surface and for stopping said vacuum head in a  
4 lateral direction.

1           18. The apparatus as in claim 1, wherein said positioning device includes a  
2 complimentary pair of resiliently compressible positioning members disposed about a  
3 receiving area such that, when said vacuum port is positioned over said opening,  
4 opposed sides of said vacuum wand head resiliently compress each of said positioning  
5 members substantially equally.

1           19. The apparatus as in claim 18, wherein said opposed sides of said vacuum  
2 head resiliently compress said positioning members in substantially opposite directions.

1           20. The apparatus as in claim 1, wherein said platform surface includes a flat  
2 receiving surface continuously receiving a gripping surface of said vacuum head, said  
3 receiving surface formed of one of stainless steel, aluminum, and Teflon.

1           21. The apparatus as in claim 1, wherein said vacuum port comprises an  
2 opening in said vacuum head open to a vacuum source and includes a recessed portion  
3 recessed below a gripping surface of said vacuum head.

1           22. A method for measuring gripping strength of a vacuum wand comprising:

2           providing a flat surface on a platform, said flat surface having an opening therein,  
3   said opening extending through said platform to a pressure gauge;  
4           placing a gripping surface of a vacuum wand head of an operating vacuum wand  
5   on said flat surface such that a vacuum port of said vacuum wand head is aligned facing  
6   said opening; and  
7           causing said vacuum gauge to read vacuum pressure exerted by said vacuum  
8   wand upon said opening.

1           23.   The method as in claim 21, further comprising automatically urging said  
2   vacuum wand head toward said flat surface.

1           24.   The method as in claim 22, further comprising automatically laterally  
2   urging said vacuum port to an alignment position over said opening.

1           25.   The method as in claim 24, wherein said automatically laterally urging  
2   comprises applying a complementary set of substantially opposite spring forces.